Psychological Medicine

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Editorial

Cite this article: Bègue I, Nicholson TR, Kozlowska K, LaFrance Jr. WC, Levenson JL, Rapaport MH, Carson AlanJ, Perez DL (2021). Psychiatry's modern role in functional neurological disorder: join the renaissance. *Psychological Medicine* **51**, 1961–1963. https://doi.org/10.1017/S0033291721002038

Received: 23 November 2020
Revised: 19 April 2021
Accepted: 30 April 2021
First published online: 24 June 2021

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CAMBRIDGE UNIVERSITY PRESS

Psychiatry's modern role in functional neurological disorder: join the renaissance

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Functional neurological symptom (conversion) disorder (FND) is a neuropsychiatric condition well described in the 19th century, yet largely ignored by late 20th century academics. This 'blind spot' is in contrast to FND's high prevalence, disability, and healthcare utilization (Espay et al., 2018). In Neurology, Mark Hallett called FND a 'crisis' based on a poor pathophysiological understanding and limited therapies (Hallett, 2006). Recent diagnostic improvements, an emerging neurobiology and renewed interest in treatment development are catalyzing a renaissance for FND among some neurologists. Unfortunately, many psychiatrists are less interested – related to a complex interplay of factors that include, in part, limited exposure (and education) in assessing and managing this population, and less psychotherapy training than a generation ago.

Some have interpreted the changes in the Diagnostic and Statistical Manual of Mental Disorders–5th Edition (DSM-5) diagnostic criteria as moving FND away from psychiatric conceptualizations and toward more neurologically-focused models. The motivation for the modification of the DSM-5 FND criteria, however, was to allow diagnosis to move from one of exclusion in DSM-IV to a rule-in approach incorporating physical signs (e.g. Hoover sign) that are internally inconsistent and incongruent with other neurological disorders (Espay et al., 2018). This change could seem to put psychiatrists at a disadvantage, given that psychiatry residents receive less training in physical examination than their neurology counterparts. Such factors can contribute to differences in diagnostic agreement across neurologists and psychiatrists (van der Salm, de Haan, Cath, van Rootselaar, & Tijssen, 2013). However, responses arguing that FND is solely a neurological disorder (and not also a psychiatric condition) are mistaken – conflating the 'what' of diagnosis with the 'why' of etiology. For example, that physical signs break the rules found in lesion-based disorders indicates that network-based 'psychological' cognitive, affective, and perceptual processes exert a hijacking influence over sensorimotor systems in FND. This process is illustrated by observations that drawing attention toward symptoms has an amplifying effect, while distraction can promote transient resolution. Similarly, heightened arousal and negative affect, linked to attentional mechanisms, can worsen FND symptoms.

The need to connect a stressor to symptom onset in the DSM-5 was relegated to a diagnostic note, removing it from the criteria list; this change has also been misunderstood in some quarters. In diagnosis, physicians emphasize features that occur consistently in FND and do not occur in other disorders. Adverse life events (ALEs) are common to many people – including those with other neurological conditions. Therefore, whilst there is an excess of ALEs in FND, and research is underway to bridge disease mechanisms and risk factors, their presence lacks specificity (Ludwig et al., 2018). ALEs are also not reported by all patients with FND – and regardless of disclosure and developmental history taking considerations – this created a diagnostic problem for the prior DSM-IV criteria.

Our viewpoint is that psychiatry should return to its roots and join the growing neurology community taking action to help address unmet clinical and research needs in FND. This

occurs amidst the recently established multidisciplinary society (www.fndsociety.org) and FND patient advocacy groups. Below, we argue that renewing the psychiatric perspective in the clinic and laboratory can benefit the FND field. Conversely, psychiatry *should* also cultivate a renewed interest in FND, as this disorder exposes the Cartesian dualism between mental and physical health that has long hampered progress in complex brain disorders.

Why does the FND field need psychiatry? The psychiatric perspective is critically important to FND patient-care and research. With the DSM-5 inclusion of examination signs, psychiatrists need more neurology training to be involved in the early phases of the FND diagnostic process (Keshavan, Price, & Martin, 2020). However, diagnosis based solely on rule-in signs does *NOT* equal a comprehensive patient-centered treatment plan. Here, psychiatric elements such as mental health comorbidities, illness beliefs, dimensional psychological traits (e.g. alexithymia, fear-avoidance, emotional lability), and psychosocial factors are important considerations. In support of this observation, psychiatric and psychosocial factors have prognostic relevance (Gelauff, Stone, Edwards, & Carson, 2014). Moreover, the developmental history and biopsychosocial formulation, foundational in psychiatry, remain leading perspectives through which to conceptualize FND (Pick, Goldstein, Perez, & Nicholson, 2019). Psychiatry is well-equipped to construct the formulation, including assessing and addressing predisposing, precipitating, and perpetuating factors. As such, psychiatrists have essential roles in developing and implementing patient-centered FND treatment plans – in addition to managing concurrently present affective symptoms and providing psychotherapy if within their scope of practice. Imbedding psychiatrists within a multidisciplinary FND team is critical – an act that also aids the development of partially-overlapping, shared expertise across team members.

Scientifically, FND research has and will continue to benefit from principles used to understand the pathophysiology of other psychiatric disorders. For example, the literature supports links between functional neurological symptoms and ALEs, underscoring the relevance of ALEs within stress-diathesis and neurodevelopmental perspectives; childhood maltreatment correlates with FND severity, treatment response, and underlying neurobiological mechanisms (Keynejad et al., 2019). Furthermore, this research shares similarities with inquiries conducted in other psychiatric disorders, highlighting experience-dependent neuroplastic consequences of adversity. Additionally, while FND is a multi-network disorder with abnormal interactions across attentional, salience, limbic, multimodal integration, and sensorimotor networks (Begue, Adams, Stone, & Perez, 2019), it shares cingulo-insular involvement with other psychiatric disorders. Lastly, modern neuropsychobiological models for FND are incorporating Bayesian inference to account for abnormal sensorimotor experiences in patients (Edwards, Adams, Brown, Parees, & Friston, 2012), formulations initially applied to conceptualize auditory hallucinations or alien-hand delusions.

Why should psychiatry be interested in FND? FND challenges the artificial divide between physical and mental health that is pervasive in healthcare and society. FND is a model disorder to understand complex brain-mind-body concepts in medical conditions. A greater investment in neuropsychiatric disorders will be advantageous for psychiatry to expand its clinical neuroscience skills. Therefore, by taking a greater interest in FND and seeing this condition as part of their professional mandate, psychiatry has the opportunity to extend its influence by bringing mind-body discussions to the center of the general hospital – advocating for a biopsychosocial conceptualization across a range of medical conditions. FND is the embodiment of a disorder that presents physically (e.g. resembling stroke, epileptic seizures), yet etiologically shares similarities with mental health disorders. The time is now to challenge the stigma associated with psychiatric disorders and break down the walls that divide mental health and physical health in society (Keshavan et al., 2020).

What is the path forward? We join like-minded colleagues encouraging a greater collaboration across psychiatry and neurology as the way to facilitate enhanced participation of psychiatry in FND-related efforts (Keshavan et al., 2020). Psychiatry and neurology remain separate disciplines and, in many countries, neuropsychiatric training does not exist. In such instances, trainees interested in disorders at the neurology–psychiatry intersection may have to undergo full training in both fields. We suggest that medical school and residency training initiatives need to promote a curriculum empowering a subset of individuals to develop overlapping expertise across psychiatry and neurology to facilitate an integrated, clinical neuroscience approach to patient care. Outreach campaigns directed at psychiatrists, psychologists, allied mental health professionals, patients, funders, and the general public are needed to emphasize the importance of *both* psychiatric and neurologic perspectives in the present and future of FND clinical care and research. Stigma can be overcome, in part, if the psychiatrist, psychologist, and/or other mental health clinician is seen as an integral part of the FND team. Therefore, new clinical pathways are needed to enhance collaboration between psychiatrists, neurologists, and allied health professionals in the assessment and management of FND – including imbedding psychiatrists within neurology clinics and developing specialized care models where patients are jointly evaluated by neurologists and psychiatrists. To accomplish these goals, increasing psychiatrists' exposure to behavioral neurology-neuropsychiatry, movement disorders and epilepsy fields is critical. Notably, the creation of a common neuropsychiatry year before specializing in psychiatry or neurology is done in some countries (e.g. in Germany where 1-year training in psychiatry for neurologists is encouraged and vice-versa for psychiatrists). The German training curriculum is in contrast to the United States Accreditation Council for Graduate Medical Education guidelines that only require 1 month of neurology for psychiatrists and 1 month of psychiatry for neurologists. The end product of this limited exchange, if not addressed expediently, is that many patients will be ill-served by two separate disciplines addressing the same organ system. This is at odds with intrinsic neural architecture, whereby the brain does not split into distinct 'neurologic' and 'psychiatric' circuits. Arguably, the deficits in integration are felt most by patients with FND and their families.

The origins of FND began over a century ago with psychiatrists and neurologists working side-by-side, and we call on psychiatry to rejoin neurologists in embracing FND's renaissance.

Acknowledgements. None.

Financial support. None.

Conflict of interest. None.

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